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may be so obscured in older rocks as to be determinable only by the closest observation. Hence, bedding, ripple marks, basal conglomerates, and phenomena indicating unconformity afford material for extended consideration.

This review would be made too long by detailed references to the second part of the "Principles," which treats of the historical geology of the pre-Cambrian time. The discussion is arranged according to districts and for each district the principle most saliently illustrated is emphasized. This part of the book constitutes a valuable summary of existing knowledge and a convenient and reliable reference.

The style of the author is the expression of complete knowledge of his subject, combined with exuberance of thought. Another great writer, whose works are characterized by brilliancy and clearness, recently said: "When I undertake to write a book I endeavor first to see what I can exclude from it, and after the process of rigid exclusion I carefully arrange the surviving ideas even to the order of paragraphs before I write." The thoughts which rush upon Van Hise are related in so many directions that many associations of the idea seek expression at once. His book would be easier to read and not necessarily less accurate, if the thought were stripped. The logical analysis is consistently carried out for all the major headings, but it is not adequately extended to the paragraphs and sentences. Nevertheless, a thorough study of the work leaves a profound impression of the earnest purpose with which it has been conceived and of its value as a contribution to one of the most difficult branches of geologic science.

BAILEY WILLIS.

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*Topographic Atlas of the United States.* Physiographic Types by  
HENRY GANNETT. Washington: U. S. Geological Survey,  
1898.

The enlightened policy adopted by our national Geological Survey of encouraging as wide a use as possible of the material gathered at great expense receives a new and welcome illustration in the publication of the first folio of the above named series. It presents ten maps as "illustrations of some of the simplest and most characteristic types of topography to be found in those parts of the United States which have been thus far mapped. Succeeding folios will illustrate more complex forms." The origin of the atlas was in a proposition of the

director of the survey to publish "an educational series of folios, for use wherever geography is taught in high schools, academies and colleges," authority for such publication having been granted by Congress in an act approved March 2, 1895.

The following titles represent the contents of this first folio: A region in youth: Fargo, North Dakota-Minnesota. A region in maturity: Charleston, W. Va. A region in old age: Caldwell, Kan. A rejuvenated region: Palmyra, Va. A young volcanic mountain: Mt. Shasta, Cal. Moraines: Eagle, Wis. Drumlins: Sun Prairie, Wis. River Flood Plains: Donaldsonville, La. A fiord coast: Boothbay, Me. A barrier-beach coast: Atlantic City, N. J. It may well be claimed that no more important, useful, or interesting series of maps could be selected for the elementary exposition of physiographic types.

It must be most encouraging to teachers of geography to find so efficient an ally as this series of folios will prove. Such a publication gives an authoritative stamp, such as has not yet been received in any other country, to the methods of modern physiographic description. It recognizes the essential importance of stage of dissection and movement with respect to baselevel, as a means, not merely of explaining the past history of a region, but of describing its present form. Withal, the text is written in a clear and simple style, certainly within the reach of even those teachers of other subjects upon whom the unexpected responsibility of having to teach geography so often falls. The few technical terms that are employed are fully explained. The relation of form to conditions of settlement and movement are touched upon. The later numbers of the series will be awaited with much interest.

Where so much is good, it gives regret to find the text of one map open to adverse criticism. The account of the Booth Bay sheet needs revision regarding glacial action. The region is described as having been for a long time "subjected to aqueous erosion, which brought it to a condition of old age with gently flowing streams, smooth slopes, and rounded divides." Upon such a surface advanced the Great Northern Glacier, and proceeded to modify it. It is difficult for the reader of this part of the text to avoid concluding that when southern Maine was thus "planed down by aqueous erosion," it was about as flat as the plains of Kansas—the type of old age—and that its marked relief today is the result of glacial erosion. There is, on the contrary, good reason for believing that since the greater part of New England was

brought to a condition of old age, it has been rejuvenated and more maturely dissected than the Piedmont upland of Virginia, the type of renewed dissection in a second cycle. The ice-sheet therefore advanced over a region of distinct hills and valleys, not over a peneplain. The implication that the ice-sheet was an effective agent of destruction is confirmed on reading that the traces of glacial action "here consist mainly of features of erosion. But little matter was deposited by it, that little consisting of what is known as 'erratics,' or granite boulders, which are scattered freely over the country. . . . A great deal of erosion, however, was done by the ice-sheet. It searched out very keenly the soft spots in the granite surface of the country and scoured them away, leaving depressions and, between such depressions, rounded hills of granite. . . . All of the soil or disintegrated rock was scraped away, leaving the granite bare; hence it is that the soil covering of southern Maine is very thin, for it has been derived mainly from the disintegration of rocks since the passing of the glacier." Apart from the implication that the hills today result from the glacial excavation of depressions between them, and from the implication that granite is the only kind of rock in this region whose linear ridges and fords give so strong an indication of foliated or stratified structures, it is unfortunate that the common veneer of till, the relatively plentiful deposits of washed gravel and sand, and the important cover of marine clays in the valley floors of southern Maine should pass unnoticed. The farmers of that region very rarely depend on soil of postglacial weathering. The rocky ridges with a thin soil, partly of glacial drift, partly of postglacial weathering, are left in uncultivated forests and woodlots.

It is further to be regretted that, after showing by the first four types that time is an important element in geographical description, no sufficient mention is made of the element of time in connection with the two examples of shore-line features. It is of course recognized that the irregular coast line of Maine is a result of the partial submergence of a rugged land; but no consideration is given to the evidence that the submergence is recent; so recent that wave action has not yet cut back the headlands, and that river action has not yet filled up the bay heads. Hence the account of shore lines is not homologous with that of land surfaces, in which the stage of advance reached by destructive processes is carefully considered. The opportunity for teaching an important principle in the evolution of shore lines is thus lost.

W. M. DAVIS.